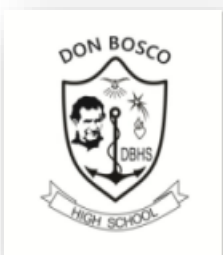


DON BOSCO HIGH SCHOOL EXAMINATION BOARD
2021 JUNIOR CERTIFICATE MOCK EXAMINATION



CHEMISTRY

(100 marks)

Subject Number: J038

Tuesday, 14th September 2021

Time Allowed: 2-hour session
8:00 -10 am

Instructions

- This paper contains 10 printed pages. Please check.**
- Write your examination Number in the spaces provided on every page of the question paper
- Answer all the **30** questions.
- This paper contains sections **A**, **B** and **C**. For Section **A**, encircle the letter representing the right answer to each question. In section **B** and **C**, write your answer on the spaces provided.
- In the table provided on this page, tick against the question number you have answered.
- Hand in your **paper** to the invigilator when time is called to stop writing.

Question Number	Tick if answered	Do not write in these columns	
1 – 20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
TOTAL			

Section A (20 marks)

1. Which molecular formula represents a hydrocarbon?
A. C_2H_5OH
B. H_3COOH
C. C_2H_6
D. H_2SO_4
2. For an atom to be negatively charged it must
A. gain electrons
B. lose electrons
C. gain protons
D. lose neutrons.
3. Which of the following processes can saturate a solution?
A. Heating the solution
B. Cooling the solution
C. Adding more solute to the solution
D. Removing some of the solution.

Study the diagram in **figure 1** and use it to answer **Questions 5 and 6**.

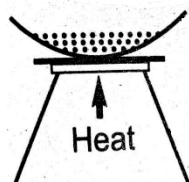


Figure 1

4. Name the process of separating mixture of substances shown in figure 1 above
A. Condensation
B. Distillation
C. Evaporation
D. Filtration
5. The diagram in figure 1 can best be used for recovering
A. sand from water
B. water from alcohol
C. salt from water
D. oil from water.
6. Why is it sometimes necessary to add lime to soils?
A. To raise soil pH
B. To lower soil pH
C. To maintain soil pH
D. To determine soil pH
7. What is the percentage composition of oxygen in $CaCO_3$? (RAM: Ca=40, C=12, O=16)
A. 12
B. 40
C. 48
D. 52
8. Which of the following substances is an element?
A. Carbon dioxide
B. Nitrogen
C. Water
D. Aluminium oxide
9. The following affect solubility of a substance **except**
A. Temperature
B. Density
C. size of particles
D. pressure

10. Which of the following are examples of a physical change?
1. Burning of coal
 2. Dissolving sugar
 3. Melting of ice
 4. Rusting of iron
- A. 1 and 2 C. 1 and 3
B. 3 and 4 D. 2 and 3
11. Heating of water causes increase in the
- A. number of its molecules
 - B. mass of its molecules
 - C. density of its molecules
 - D. distance between its molecules
12. The number of atoms contained in one molecule of $\text{K}_3\text{Fe}(\text{CN})_6$ is
- A. 9
 - B. 10
 - C. 16
 - D. 18
13. Metals conduct electric current because they
- A. protons
 - B. electrons
 - C. free electrons
 - D. free protons
14. The products of incomplete combustion are
- A. Water and oxygen
 - B. Carbon monoxide and water
 - C. Oxygen and carbon dioxide
 - D. Carbon dioxide and water
15. Which of the following reactions would result in the production of salt and water?
- A. Addition
 - B. Combustion
 - C. Neutralization
 - D. Substitution
16. The quantity of matter of a substance is measured in
- A. Newton
 - B. Kilograms
 - C. Newton-meter
 - D. kilometer
17. Which of the following shows a balanced chemical equation?
- A. $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 - B. $4\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
 - C. $\text{CH}_4 + 2\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}$
 - D. $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
18. Which of the following are properties of bases?
1. they have a bitter taste
 2. they turn red litmus paper to blue
 3. they facilitate rusting
 4. they conduct electricity
- A. 1.2 and 4
B. 1, 2 and 3
C. 2, 3 and 4
D. 1, 3 and 4
19. Which of the following mixture is heterogeneous?
- A. common salt and water
 - B. alcohol and water
 - C. salt and sand
 - D. sugar and water
20. Write the value of **0.00507** in standard form
- A. 507×10^{-5}
 - B. 5.07×10^{-3}
 - C. 50.7×10^{-4}
 - D. 0.507×10^{-2}

SECTION B (50 marks)

21. a. Figure 2 shows boiling points of alkanes. Use it to answer the questions that follow.

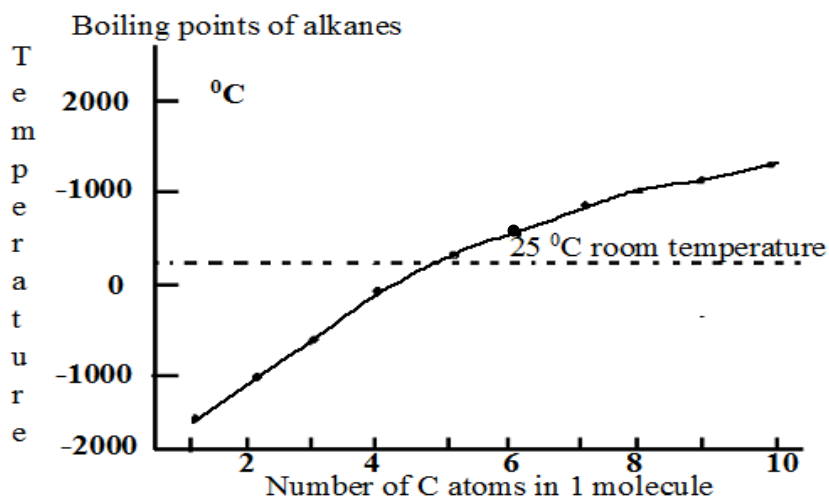


Figure 2

- i) What is happening to the boiling points as the sizes of the molecules increase?

(2 marks)

- ii) Explain your answer given to 21 a. i).

(2 marks)

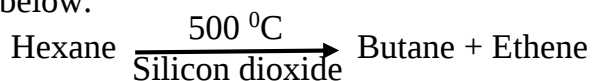
- iii) Is the boiling point of hexane below or above 25°C?

(1 mark)

- iv) What state is hexane at room temperature?

(1 mark)

- b. When Hexane is cracked, butane and ethene are obtained according to the equation below.



- i) Identify the type of cracking in the equation above.

(1 mark)

Continued/...

21. (Continued)

- ii) What role does Silicon dioxide play?

(2 marks)

- iii) Write a chemical equation for the equation above.

(2 marks)

22. a. Define soil pollution.

(1 mark)

- b. Describe any **two** chemical properties of soil.

(4 marks)

23. a. Magnesium reacts with oxygen gas (O₂) in a reaction below.



Balance the equation above.

(2 marks)

- b. If **60g** of Mg was used what would be the mass of MgO produced.
(RAM: Mg = 24, O =16)

(4 marks)

Continued/...

24. a. Outline any two properties of a base.

(2 marks)

- b. Explain why it is necessary to add ethanol to the crushed plant materials when extracting acid/base indicator from local material.

(2 marks)

- c. Briefly, describe how the strength of an acid can be tested.

(2 marks)

25. a. Define matter.

(1 mark)

- b. Describe any two evidence of particulate of matter.

(4 marks)

- c. State the difference between accuracy and precision.

(2 marks)

26. a. Give three ways in which atoms attain stability.

(3 marks)

Continued/...

- b. Magnesium and chlorine can be represented as $^{24}_{12}\text{Mg}$ and $^{35.5}_{17}\text{Cl}$, respectively.

i) What are the valencies of magnesium and chlorine?

Magnesium _____ (1 mark)

Chlorine _____ (1 mark)

ii) What is the molecular formula of the compound formed as a result of magnesium reacting with chlorine?

(2 marks)

27. a. Draw an electron dot and cross diagram of ethene (C_2H_4) given that carbon is in group IV and hydrogen is in group I of the periodic table.

(5 marks)

b. What type of bonding exists in ethene molecule?

(1 mark)

c. Give a reason for the answer to 27 b).

(2 marks)

SECTION C (30 marks)

- 28. a.** Using a clearly labelled diagram, describe how chromatography could be used to show that a green leaf contains a mixture of dyes.

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(6 marks)

- b.** Briefly, describe how kitchen salt could be obtained from a mixture of kitchen salt and sand.

[illegible]

(4 marks)

[illegible]

Continued/...

- 30. a.** Describe an experiment that could be carried out to show the effect of size of particles on the solubility of sugar in water.

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(8 marks)

- b.** State any two sources of error in the experiment.

(2 marks)

END OF QUESTION PAPER

NB: This paper contains 10 printed pages.